

Recycled Municipal Water

Water recycling, also known as reclamation or reuse, is an umbrella term encompassing the process of treating wastewater, storing, distributing, and using the recycled water. Recycled water is defined in the California Water Code to mean “water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur.”

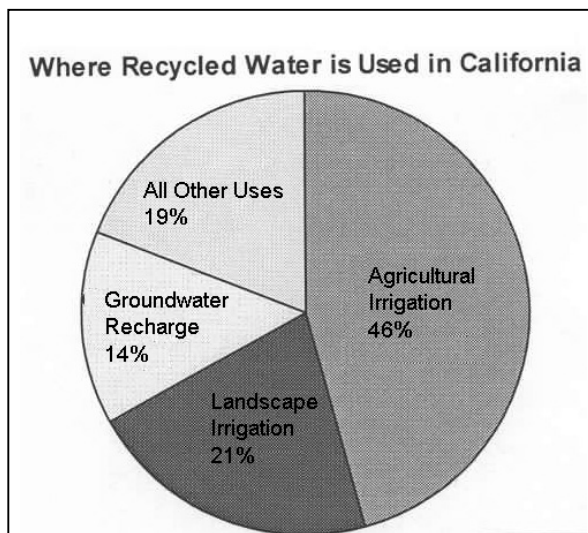
The treatment and use of municipal wastewater for golf course irrigation is an example of water recycling. Higher levels of treatment beyond disinfected tertiary recycled water can make municipal wastewater reusable for school yards, residential landscape and park irrigation, industrial uses or even uses within office and institutional buildings for toilet flushing.

The following discussion of recycled water focuses on treated municipal wastewater. This is wastewater of domestic origin, but includes wastewater of commercial, industrial and governmental origins if such wastewater is commingled with domestic wastewater before treatment. Many industries recycle and reuse their own wastewater. However, due to lack of data, recycling of non-domestic wastewater is not included in the recycling quantity estimates in the following pages.

Current Recycled Water Use in California

Californians have used recycled water since the late 1800s and public health protections have been in effect since the early part of the 1900s. Recycled water use has dramatically increased in the past several decades as water agencies needed to supplement their water supplies. Today, California’s water agencies recycle about 500,000 acre-feet of wastewater annually, almost three times more than in 1970.

The 40-member Recycled Water Task Force was established pursuant to Assembly Bill No. 331(Goldberg, Chapter 590, Statutes of 2001). The Task Force identified opportunities for, and constraints and impediments to, increasing the use of recycled water in California. Over the course of nearly 14 months, the Task Force conducted intensive study in collaboration with many other experts, the public at large, and state staff to develop recommendations (see side bar on following pages) for actions at many levels. The recommendations are not restricted to legislative actions or statutory changes. Many can be implemented by state or local agencies without further legislative authorization or mandate.



California Recycled Water Task Force Recommendations Summary (2003)

Funding for Water Recycling Projects. State funding for water reuse/recycling facilities and infrastructure should be increased beyond Proposition 50 and other current sources. The California Water Commission in collaboration with DWR and SWRCB should seek federal cost sharing legislation for water recycling.

Funding Coordination A revised funding procedure should be developed to provide local agencies with assistance in potential state and federal funding opportunities and a Water Recycling Coordination Committee should be established to work with funding agencies.

Department of Water Resources Technical Assistance. Funding sources should be expanded to include sustainable state funding for DWR's technical assistance and research, including flexibility to work on local and regional planning, emerging issues, and new technology.

Research Funding. The state should expand funding sources to include sustainable state funding for research on recycled water issues.

Regional Planning Criterion. State funding agencies should make better use of existing regional planning studies to determine the funding priority of projects. This process would not exclude projects from funding where regional plans do not exist.

Funding Information Outreach. Funding agencies should publicize funding availability through workshops, conferences, and the Internet.

Community Value-Based Decision-Making Model for Project Planning. Local agencies should engage the public in an active dialogue and participation using a community value-based decision-making model in planning water recycling projects.

State-Sponsored Media Campaign. The state should develop a water issues information program, including water recycling, for radio, television, print, and other media.

Educational Curriculum. The state should develop comprehensive education curricula for public schools; and institutions of higher education should incorporate recycled water education into their curricula.

University Academic Program for Water Recycling. The state should encourage an integrated academic program on one or more campuses for water reuse research and education, such as through state research funding.

Statewide Science-Based Panel on Indirect Potable Reuse. As required by AB 331, the Task Force reviewed the 1996 report of the California Indirect Potable Reuse Committee and other related advisory panel reports and concluded that reconvening this committee would not be worthwhile at this time. However, it is recommended to convene a new statewide independent review panel on indirect potable reuse to summarize existing and on-going scientific research and address public health and safety as well as other concerns such as environmental justice, economic issues and public awareness.

Leadership Support for Water Recycling. State government should take a leadership role in encouraging recycled water use and improve consistency of policy within branches of state government and local agencies should create well-defined recycled water ordinances and enforce them.

DHS Guidance on Cross-connection Control. DHS should prepare guidance that would clarify the intent and applicability of Title 22, Article 5 of the California Code of Regulations pertaining to dual plumbed systems and amend this article to be consistent with requirements included in a California version of Appendix J that the Task Force is recommending to be adopted.

Health and Safety Regulation. DHS should involve stakeholders in a review of various factors to identify any needs for enhancing existing local and state health regulation associated with the use of recycled water.

Stakeholder Review of Proposed Cross-Connection Control Regulations. Stakeholders are encouraged to review Department of Health Services draft changes to Title 17 of the Code of Regulations pertaining to cross-connections between potable and nonpotable water systems.

Cross-Connection Risk Assessment. DHS should support a thorough assessment of the risk associated with cross-connections between disinfected tertiary recycled water and potable water.

Uniform Plumbing Code Appendix J. The state should revise Appendix J of the Uniform Plumbing Code, which addresses plumbing within buildings with both potable and recycled water systems, and adopt a California version that will be enforceable in the state.

Recycled Water Symbol Code Change. The Department of Housing and Community Development should submit a code change to remove the requirement for the skull and crossbones symbol in Sections 601.2.2 and 601.2.3 of the California Plumbing Code.

Incidental Runoff. The state should investigate, within the current legal framework, alternative approaches to achieve more consistent and less burdensome regulatory mechanisms affecting incidental runoff of recycled water from use sites.

Source Control. Local agencies should maintain strong source control programs and increase public awareness of their importance in reducing pollution and ensuring a safe recycled water supply.

Water Softeners. The Legislature should amend the Health and Safety Code Sections 116775 through 116795 to reduce the restrictions on local ability to impose bans on or more stringent standards for residential water softeners. Within the current legal provisions on water softeners, local agencies should consider publicity campaigns to educate consumers regarding the impact of self-regenerative water softeners.

Uniform Interpretation of State Standards. The state should create uniform interpretation of state standards in state and local regulatory programs by taking specific steps recommended by the Task Force.

Permitting Procedures. Various measures should be conducted to improve the administration and compliance with local and state permits. State and local tax incentives should be provided to recycled water users to help offset the permitting and reporting costs associated with the use of recycled water.

Uniform Analytical Method for Economic Analyses. A uniform and economically valid procedural framework should be developed to determine the economic benefits and costs of water recycling projects for use by local, state, and federal agencies.

Project Performance Analysis. Resources should be provided to funding agencies to perform comprehensive analysis of the performance of existing recycled water projects in terms of costs and benefits and recycled water deliveries.

Economic Analyses. Local agencies are encouraged to perform economic analyses in addition to financial analyses for water recycling projects and state and federal agencies should require economic and financial feasibility as two criteria in their funding programs.

The Task Force recommendations, if implemented, would significantly:

- Improve the way projects are planned
- Increase state and federal financial support for research and project construction
- Improve the regulatory framework
- Lead to advance the use of recycled water as a valuable resource that would significantly mitigate growing water demands as called for by the California Water Code, Sections 13500 et seq.

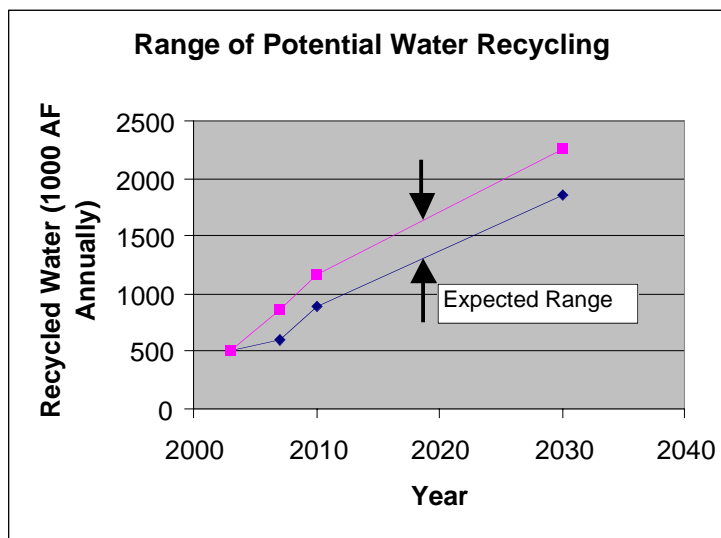
Progress has begun on several of the Task Force recommendations. For example, the SWRCB issued an Executive Memorandum to Regional Board Executive Officers on February 24, 2004 setting a new framework for regulating of incidental runoff associated with recycled water use. AB 334 (Goldberg, Chapter 172, Statutes of 2003) gives communities additional flexibility to regulate water softeners as a source control measure.

Potential Benefits from Water Recycling

The primary benefit of water recycling is augmenting water supply. Rather than discharging and losing the water, recycled water can be reused as a new water supply. Using recycled water for irrigation can spare high quality potable water currently used for irrigation, making more potable water supply available. There is a potential of about 1.5 million acre-feet of additional recycled water by the year 2030. Of that amount, about 1.2 million acre-feet would be new water supply.

Recycling in some areas may provide new water for the water agency, but not the state. Discharged wastewater in interior California mixes with

other water and becomes source water for downstream water users. Only areas, such as coastal areas or areas discharging to an unusable salt sink, add new water supply to the state by recycling wastewater.



For many communities, an investment in recycled water could also provide other benefits:

1. Provide more reliable local sources of water, nutrients, and organic matter for agricultural soil conditioning and reduction in fertilizer use
2. Reduce the discharge of pollutants to water bodies, beyond levels prescribed by regulations, and allow more natural treatment by land application
3. Provide a more secure water supply during drought periods
4. Provide economic benefits resulting from a more reliable water supply
5. Improve groundwater and surface water quality and contribute to wetland and marsh enhancement.
6. Provide energy savings; the use of recycled water as a local source offsets the need for energy-intensive imported water

Potential Costs of Recycled Water

The estimated capital cost for 1.5 million acre-feet of more recycled water is about \$11 billion. The actual cost will depend on the quality of the wastewater, the treatment level to meet recycled water intended use, and the availability of a distribution network. Uses, such as irrigation near the treatment plant, will benefit from lower treatment and distribution costs. Irrigation of a wide array of agriculture and landscape crops can even benefit from the nutrients present in the recycled water by lowering the need for applied fertilizer. However, the use of recycled water for irrigation without adequate soil and water management

may cause accumulation of salts or specific ions in soil and groundwater. Some uses, such as an industrial process located farther away from the treatment plant, may need to pay higher costs for treatment and distribution. Given the wide range of local conditions that can affect costs, the majority of applications would cost between \$300 and \$1,300 per acre-foot of recycled water. Costs outside this range may be plausible depending on local conditions. Uses that require higher water quality and have higher public health concerns will have higher costs.

Major Issues Facing More Recycled Water Use

There are major issues facing more recycled water use.

Affordability

The cost of recycled water, relative to other water sources, will influence how much recycled water is produced for each region. The costs are dependent on the availability of treatable water, demand for treated water, the quality of the source as well as the product water, the type of the intended beneficial use, and the proximity of recycled water facilities to the end users. The lack of adequate local funding to plan feasible recycled water projects can slow the construction of new projects. Public funding as well as incentive measures can help advance water recycling projects that provide local, regional and statewide benefits. The cost of recycled water can influence water markets, especially if recycled water is available for transfer.

Water Quality

The quality of the recycled water will affect its usage. Public acceptance of recycled water use is dependent on confidence in the safety of its use. Four water quality factors are of particular concern: (1) microbiological quality, (2) salinity, (3) presence of toxicants of the heavy metal type, and (4) the concentration of stable organic and inorganic substances or emerging contaminants originating from various pharmaceuticals and personal care products, household chemicals and detergents, agricultural fertilizers, pesticides, fungicides, animal growth hormones, and many other sources. The salinity of recycled water can limit its usefulness for some applications such as salt sensitive landscaping, golf courses, and agriculture. Each use of water generally adds salt to the water. In particular, the use of water softeners adds salt to the water. Also, water conservation can further concentrate salts. Hence, the resulting wastewater, that is high in salts, would be more difficult and expensive to recycle. There is generally a limit to how many times water can be recycled unless a more expensive treatment technology, such as reverse osmosis, is used to remove the salts (see the Desalination strategy).

Public Acceptance

Public perception and acceptance of some recycled water uses currently limits its application. In some areas, public concerns about potential health issues have limited the use of recycled water for indirect potable purposes and even for irrigation of parks and school yards.

Potential Impacts

Areas in interior California that discharge their wastewater to streams, rivers, or the groundwater contribute to downstream flows. Recycling water would remove this source of water and potentially affect downstream water users including the environment. In some instances, recycling is discouraged when dischargers are required to maintain a certain flow in the stream for downstream users.

Recommendations to Increase Recycled Water Usage

State and local agencies and various stakeholders should actively follow up with the implementation of the Recycled Water Task Force recommendations (see above sidebar on Task Force recommendations) as they constitute a culmination of intensive study and consultation by a statewide panel of experts drawing upon the experience of many agencies. Such recommendations provide advice that can be used as a toolbox for communities to improve their planning of recycled water projects.

Information Sources

- Water Recycling 2030, California Recycled Water Task Force Report, 2003.
- SWRCB, California Municipal Wastewater Reclamation Survey, 2003.
- Water Recycling 2000, California's plan for the future. State Water Conservation Coalition, Reclamation/Reuse Task Force and the Bay Delta Reclamation Sub-Work Group, 1991.
- Southern California Comprehensive Water Reclamation and Reuse Study, Phase II. Final Report (Draft), 2000.
- Other Reports such as DWR Water Recycling Survey, 1993, California Water Plan Update 1998.